



European Network of Materials Research Centres

NAME: FUNDACIÓN ITMA

INSTITUTION: FUNDACIÓN ITMA

COUNTRY: SPAIN

Profile :

ITMA Foundation is a non-profit and private foundation which aims at promoting companies' innovation through applied research and technological development in the field of materials science.

ITMA Foundation manages two centers with nearly 7.000m², 4.600m² of which are dedicated to laboratories and has a total staff of 93 people comprising scientists (55), technicians (27) and administrative support (11).

Research performed in ITMA is fully multidisciplinary and targets at the following strategic sectors: Healthcare, Energy, Space & Aeronautics, Capital Goods, Metallurgy and Steel, Defence & Home Security, Waste Valorization and Automotive Industry.

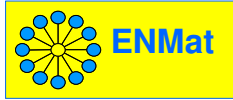
ITMA Foundation participates in numerous collaborative projects at regional, national and European level, coordinating some of them.

Activities :

- Research and development towards the development of innovative materials and processes in areas of specialization where ITMA provides reference capabilities nationally and internationally, thus becoming a strategic partner of targeted industries.
- Technological Services such as chemical analysis, mechanical behaviour, metrology and machining.
- Training: ITMA Foundation provides customized training courses on materials science to help meet the educational needs of academia and industry. ITMA also organizes specialised masters, i.e European Welding Engineer and Masters in Materials Science and Engineering, as well as conferences and workshops (both internal and external) regarding new trends in materials science and novel processing technologies.

Expertise on following materials:

- Metals and alloys: new advanced steels, aluminium and magnesium alloys
- Biomaterials
- Advanced Ceramics
- Cements and Refractory Materials
- Nanomaterials
- Polymers
- Ultrafunctional materials



Actual research domains concerning materials technology / Competences :

Department of Metallic Materials:

- Fusion and moulding of iron foundries and aluminium alloys.
- Determination of transformation curves (CHT, CST, TTT) and structural steel transformations. Kinetics of transformation.
- Design and optimization of heat treatments, thermomechanical treatments and surface treatments of steels and alloys.
- Microstructural characterization of metal components.
- Behaviour of metallic materials in aggressive environment.
- Study of failure causes on metallic materials due to exposure to aggressive environments.
- Research on Investigation of anti-corrosive coatings

Department of Simulation:

- Numerical simulation of components, products and industrial processes by FEM in order to identify potential problems in the design or selection of materials.

Department of Structural Integrity:

- Fatigue characterization (high and low number of cycles, loading blocks and variable load), fracture mechanics (linear and elasto-plastic) and determination of growth rates for fatigue cracks.
- Mechanical testing made-to-measure of components and structures in static or dynamic conditions.
- Studies of the relationship between the behaviour of in-service materials and their complete manufacturing process (microstructure).
- Analysis of in-service failures on components and equipment.
- Research in welding technologies (Study of the quality of welds, Evaluation in-service of welds under mechanical solicitations and aggressive environments, Microstructural and mechanical characterization of welds and overlays (zone of melt and HAZ, Study of in-service behaviour of welds under mechanical actions (static and dynamic) and environmental actions (corrosion and rust), Repair and recovery of equipment degraded by use, Analysis of in-service failures of welded components).

Department of Nanomaterials:

- Thin films for solar cells.
- Synthesis, characterization and processing of nanostructured powders and materials, mainly in generation of materials with controlled nano/microstructural characteristics.
- Research on nanopowders processing and their transformation into bulk materials with engineered properties and technological functions

- Introduction of new device concepts and manufacturing methods.
- Structural (SEM, XRD and Advanced Optical Microscopy) and mechanical (nanoindentation) characterization techniques

Ceramic Materials and Raw Materials:

- Development of improved refractory materials
- Manufacture of prototypes, preserves, special pieces in ceramic materials
- Development of recycling technologies
- Analysis of adjudication and expert opinions related to the behavior in-service of materials and their degradation mechanisms

Available research infrastructure :

Some of the main equipments available at ITMA Foundation are listed below.

The full research infrastructure can be found on the website: www.itma.es

- Rotary slag test furnace
- X-Ray diffractometer
- Equipment for the determination of abrasion resistance of refractory products, according to ASTM C-704 and EN-ISO 16282
- Netzsch RUL 421 thermoanalysis system equipped with a controlled atmosphere high temperature furnace (1700° C) as well as an exact displacement sensor with a resolution of 5 nm
- Testing machines for compression and modulus of rupture
- Heating Microscope
- Laser device for the determination of particle size in suspensions, emulsions, solids and aerosols from 0.1 to 2000 micrometers
- Helium pycnometer
- Dilatometers (Quench and strain dilatometer and high temperature dilatometer)
- Vacuum furnace with controlled atmosphere
- Induction crucible furnace with double frequency
- Induction furnace MINIMELT
- High vacuum melting furnace
- Hot dip process simulator
- Disbonding equipment
- Spot welding equipment
- Universal testing machines (INSTRON 600DX, INSTRON 5582 and INSTRON 8562 with TERMOLAB furnace of 1750 ° C and controlled atmosphere)
- Nanoindenter
- Physical Vapor Deposition by Sputtering
- Plasma assisted chemical vapor deposition
- Solar simulator
- Field Assisted Electron Microscopy
- Confocal microscopy



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